



SUSTAINOVATE:

Webbasiertes Life Cycle Sustainability Assessment Tool für die
Bewertung von Renovations-Varianten

TTT Wissenschaftskongress 2025: Klimaneutrales Bauen und Sanieren

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**Innovation project
supported by**



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Renovationen von Mehrfamilienhäuser



Entscheidungsträger

Immobilienbesitzer

Verwaltung

Planer

Gebäudemanager

Gemeinden

Architekten

...

SUSTAINOVATE = **SUSTAIN**(ability & Ren)**OVATE**



- ✓ Vergleichsmöglichkeit diverser Renovationsmassnahmen für Mehrfamiliengebäude auf Basis verschiedener Kriterien
- ✓ Ganzheitliche Nachhaltigkeit & Lebenszyklussicht

Umweltbezogenes Life Cycle Assessment (eLCA)

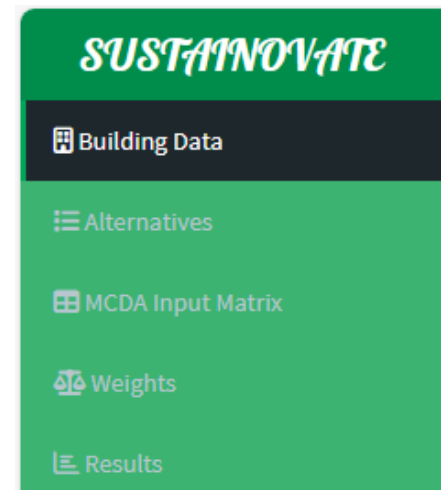
Soziales Life Cycle Assessment (sLCA)

Lebenszyklus**kosten** (LCC)

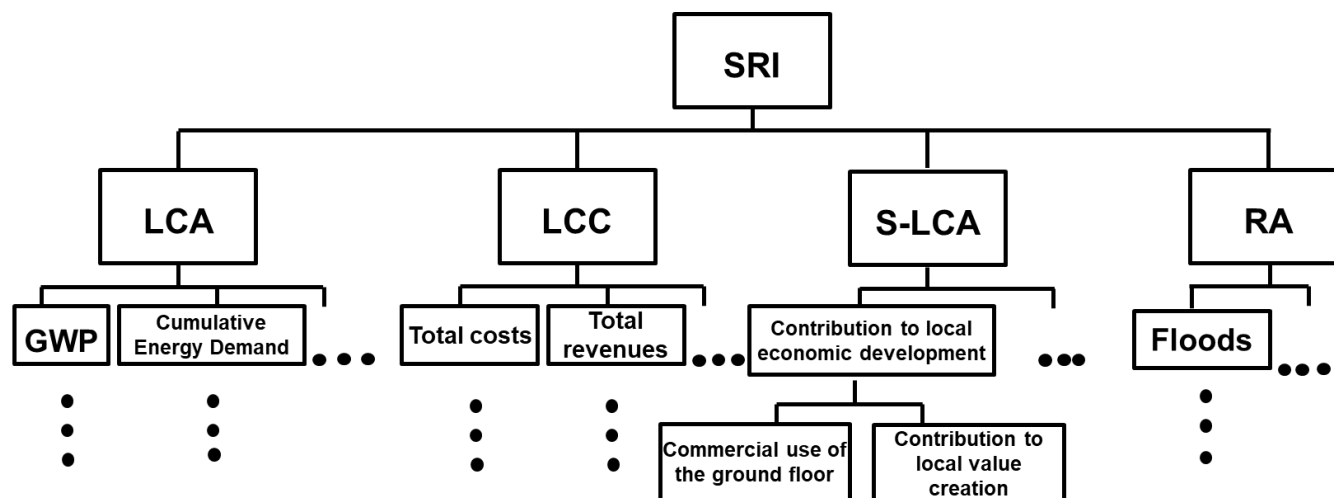
Resilienzbewertung(RA)

**Multi-Kriterien-
Entscheidungsanalyse
(MCDA)**

Unterstützt informierte und ganzheitliche
Entscheidungsfindung für nachhaltige Renovationslösungen
und deren Implementierung in der Schweiz.



Background: Aufbau und Kriterien



- ✓ Hierarchische Struktur der Kriterien
- ✓ Voreingestellte Gewichtungen plus eigene Gewichtung möglich

1st Level	2nd Level	Weight [%]	3rd Level	Weight [%]
eLCA	Global Warming Potential	24%	GWP100-fossil (CO ₂ -eq.)	39%
			GWP100-biogenic (CO ₂ -eq.)	32%
			GWP100-land transformation (CO ₂ -eq.)	29%
	Cumulative Energy Demand	22%	Non-renewable CED (MJ)	54%
			Renewable CED (MJ)	46%
	Land and water (ecosystem) impacts	20%	Acidification (AP) (kg SO ₂ eq)	54%
eLCA	Atmospheric impacts (ozone)	18%	Eutrophication (EP) (kg PO ₄ -- eq.)	46%
			Stratospheric Ozone Depletion Potential (ODP) (kg CFC-11 eq)	51%
	Abiotic Depletion Potential	16%	Photochemical Ozone Creation Potential (POCP) (kg NMVOC)	49%
			Abiotic depletion, elements (kg Sb-eq.)	100%
LCC	Total Life Cycle Cost	57%	CAPEX	24%
			OPEX	24%
			CO ₂ fee	20%
			Disposal fee	18%
	Total Life Cycle Revenues	43%	Taxes	15%
			Material sales	23%
sLCA	Save and healthy living conditions for users	29%	Energy sales	25%
			Rental income	30%
			Subsidies	22%
	Accessibility for all kind of users	20%	Material sales	23%
			Energy sales	25%
	Contribution to local economic development	15%	Rental income	30%
RA	Cultural heritage of building/district	17%	Subsidies	22%
			Acoustic/thermal comfort	36%
			Indoor air quality: VOC concentration	36%
	Promoting social responsibility	19%	Possibility for users to exert influence	28%
			Accessibility of the building for all user groups	100%
	Heavy Rain / Hail	25%	Commercial use of the ground floor	46%

SUSTAINOVATE: Aktuelle Gebäudeinformationen



SUSTAINOVATE

- Building Data
- Alternatives
- MCDa Input Matrix
- Weights
- Results

Actual Building Information

Heated Area (m²)

Electricity Demand (kWh/a)

Heat Demand (MJ/a)

Hot Water Demand (MJ/a)

Number of Apartments

Plinth Level (m)

Wall Thickness (m)

Drainage

Thermally Activated Building System

Floor Coverage

Wall Material

Door Material

Acoustic/thermal comfort

VOC Concentration

Possibility for users to exert influence

Accessibility of the building

Commercial use Ground Floor

Local Value Creation

External appearance

Social activities

Auswahl Renovationsmassnahmen

Renovation Measure 1 Renovation Measure 2 Renovation Measure 3

Potential Renovation Measures

Heated Area (m²)
1000

☐ Install PV?

PV Type
multiSi

PV Location
flatroof

PV Area (m²)
0

☐ Install Green Roof?

Green Roof Area (m²)
0

☐ Install Sun Shades?

Sun Shades Area (m²)
0

☐ Install Heat Pump?

Heat Pump Type
BrineWater

Heat Pump Power (kW)
0

Heat Pump Borehole Depth (m)
0

Heat Pump Coolant
Trifluoromethane

☐ Use District Heating?

District Heating (MJ)
0

District Heating Fuel
Oil

☐ Install Pellet Furnace?

☐ Install Solarthermal?

☐ Insulation?

Insulation Material
Cellulose

What is the required surface area for insulation? (m²)
0

What U-value should be achieved? (W/m²K)
0

☐ Windows?

Windows Type
Double

Windows size (m²)
0

Number of Windows
0

Window Frame Type
Wood

SUSTAINOVATE

Building Data

Alternatives

MCDA Input Matrix

Weights

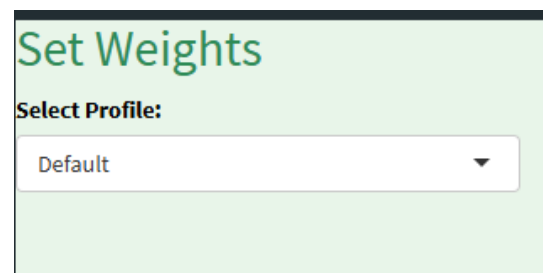
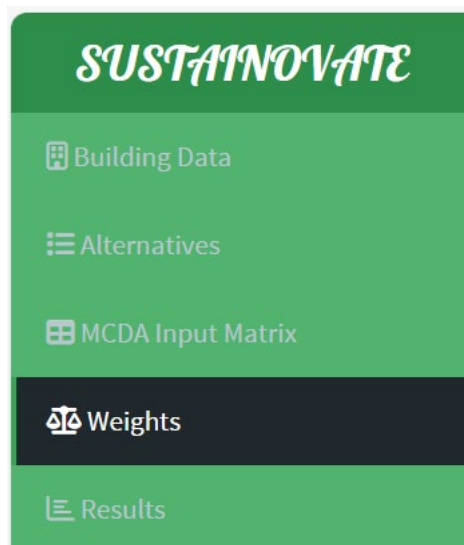
Results

Rohdaten / Gewichtungen

MCDA Input Matrix

Show 10 entries

	GWP100-fossil	GWP100-biogenic	GWP100-land transformation	CED-non-Renewable	CED-Renewable	Acidification
Baseline	9.957	0.012186	0.003768	187.65	49.185	0.024135
Renovation Measure 1	12.6387249	0.01753439556675	0.00643582131	245.725154575	56.28011431875	0.043941204825
Renovation Measure 2	9.81353323361421	0.00236560995281163	0.00163571919289913	140.804729192923	6.82299897102058	0.02400509674916



Ergebnisse - Ebenen

SUSTAINOVATE

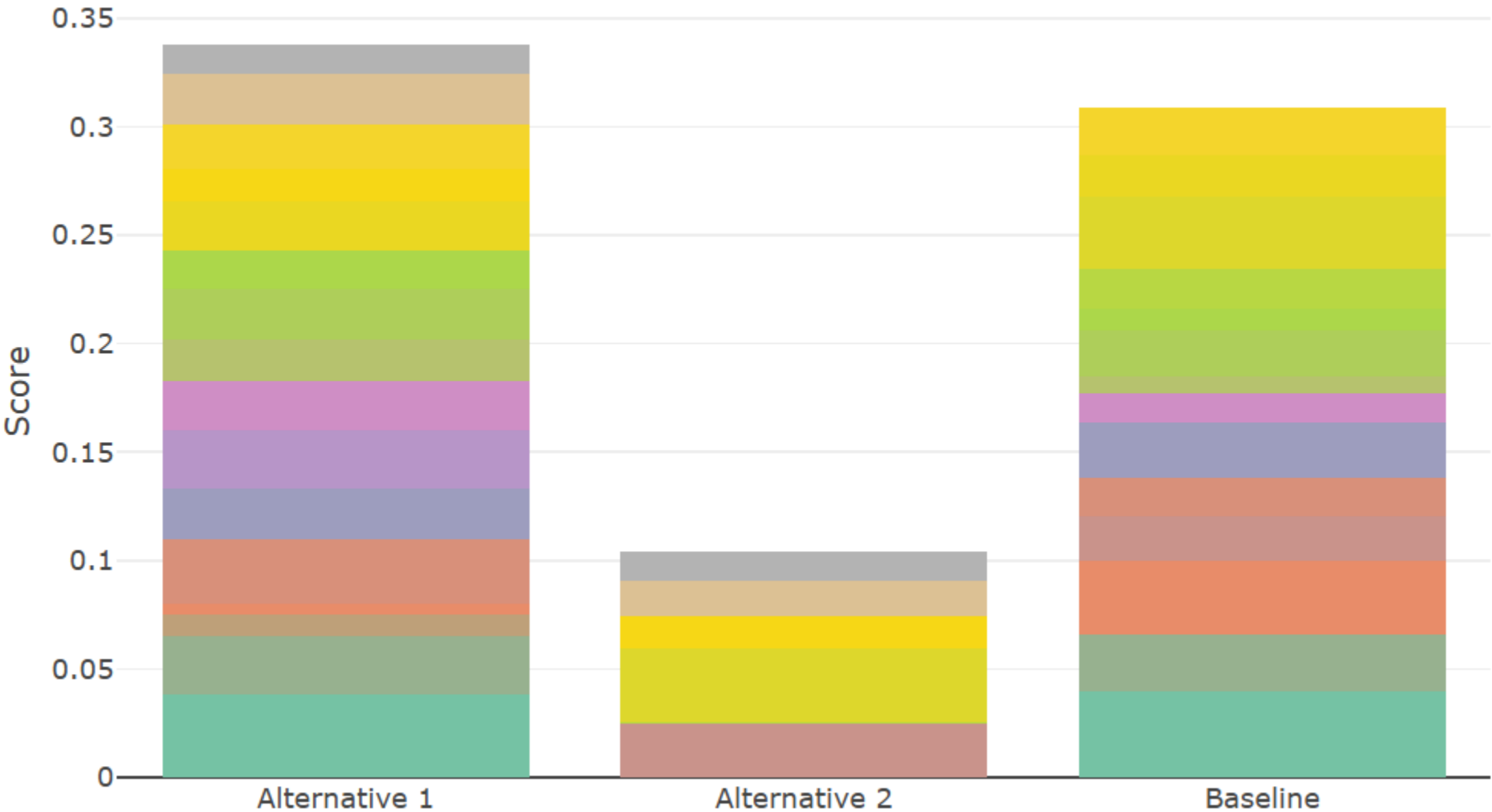
Building Data

Alternatives

MCDA Input Matrix

- Windows Type
- Wall Thickness
- Wall Material
- VOC Concentration
- Thermally Activated Building System
- Taxes
- Subsidies
- Social activities
- Resource Availability
- Rental Income
- Possibility for users to exert influence
- Plinth Level
- Photochemical Ozone Creation Potential
- Personal in Place
- Ozone Depletion Potential
- OPEX
- Material Sales
- Local Value Creation
- Insulation
- GWP100-land transformation
- GWP100-fossil
- GWP100-biogenic
- Floor Coverage
- Fair wages
- External appearance
- Expected Shortage
- Expected Adverse Thermal Conditions
- Eutrophication
- Environmental standards
- Energy Sales
- Electricity Autarchy Level
- Drainage
- Doors Material
- Disposal fee
- Commercial use Ground Floor
- CO2 fee
- CED-non-Renewable
- CED-Renewable
- CAPEX
- Backup for water
- Backup for heating
- Backup for electricity
- Acoustic/thermal comfort
- Acidification
- Accessibility of the building
- Abiotic Depletion Potential

Lower Level Contributions



Aktueller Stand & Ausblick

- 1) Aktuell: Letzte Anpassungen, Verbesserung der Oberfläche
 - 2) Validierung: Testen von realen Anwendungsfällen
 - 3) Überarbeitung & Abschluss
-
- Aktuell ist die Nutzung des Tools nur in Kooperation mit uns möglich.
 - Bei Interesse & möglichen Anwendungsfällen zu Testzwecken gerne bei uns melden.

1. Bei welchen Anwendungsfällen kann
SUSTAINOVATE zielführend eingesetzt
werden?

2. Kennen Sie aktuelle Fälle?
Wie wurden solche Fälle bisher gelöst?

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Vielen Dank!



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